

WHAT IS CLAIMED IS:

1. An adhesive system for bonding a fluorohydrocarbon film to a building material substrate having hydroxyl functional groups, comprising:
  - an isocyanate compound that is adapted to wet the fluorohydrocarbon film and form a physical bond with the film; and
  - a catalyst wherein the catalyst catalyzes a reaction between the isocyanate compound and the hydroxyl functional groups present in the substrate so as to form a chemical bond between the isocyanate compound and the hydroxyl functional groups in the substrate.
2. The adhesive system of Claim 1 wherein the isocyanate compound comprises an aromatic isocyanate.
3. The adhesive system of Claim 1 wherein the isocyanate compound comprises an isocyanate group terminated prepolymer synthesized from an aromatic isocyanate.
4. The adhesive system of Claim 3 wherein the prepolymer is synthesized from isocyanate and an organic compound, wherein the organic compound has at least two active hydrogen containing functional groups.
5. The adhesive system of Claim 4 wherein the active hydrogen containing functional groups are selected from the group consisting of  $-\text{COOH}$ ,  $-\text{OH}$ ,  $-\text{NH}_2$ ,  $-\text{NH}-$ ,  $-\text{CONH}_2$ ,  $-\text{SH}$ , and  $-\text{CONH}-$ .
6. The adhesive system of Claim 1 wherein the isocyanate compound comprises an aliphatic isocyanate.
7. The adhesive system of Claim 1 wherein the isocyanate compound comprises an isocyanate group terminated prepolymer synthesized from an aliphatic isocyanate.
8. The adhesive system of Claim 7 wherein the prepolymer is synthesized from isocyanate and an organic compound, wherein the organic compound has at least two active hydrogen containing functional groups.
9. The adhesive system of Claim 8 wherein the hydrogen containing functional groups are selected from the group consisting of  $-\text{COOH}$ ,  $-\text{OH}$ ,  $-\text{NH}_2$ ,  $-\text{NH}-$ ,  $-\text{CONH}_2$ ,  $-\text{SH}$ , and  $-\text{CONH}-$ .
10. The adhesive system of Claim 1 wherein the isocyanate compound comprises between about 10% and 33% by weight NCO functional group.

11. The adhesive system of Claim 1 wherein the isocyanate compound has functionality between about 2.0 and 3.5.
12. The adhesive system of Claim 1 wherein the isocyanate compound has a viscosity between about 200 centipoise and 200,000 centipoise.
13. The adhesive system of Claim 1 wherein the catalyst comprises between about 0.005% and 5% by weight of the adhesive system.
14. The adhesive system of Claim 1 wherein the catalyst comprises a bismuth-based salt.
15. The adhesive system of Claim 1 wherein the catalyst comprises a zinc-based salt.
16. The adhesive system of Claim 1 wherein the catalyst comprises a tin-based salt.
17. The adhesive system of Claim 1 further comprises a plasticizer.
18. The adhesive system of Claim 17 wherein the plasticizer comprises an alkyl phthalate.
19. The adhesive system of Claim 1 further comprises a defoamer and a moisture scavenger.
20. The adhesive system of Claim 1 further comprises an antioxidant, a UV absorber, and a heat stabilizer.
21. The adhesive system of Claim 1 wherein the building material substrate comprises a fiber cement material.
22. The adhesive system of Claim 21 wherein the fluorohydrocarbon film comprises a polyvinyl fluoride film.
23. The adhesive system of Claim 1 wherein the building material substrate comprises wood.
24. An adhesive system for bonding a fluorohydrocarbon film to a building material substrate, comprising:
  - an isocyanate compound that is adapted to wet the fluorohydrocarbon film and form a physical bond with the film;
  - a polyol containing hydroxyl functional groups; and
  - a catalyst wherein the catalyst catalyzes a reaction between the isocyanate compound and hydroxyl functional groups so as to form a polyurethane based polymer wherein the polymer physically interlocks and bonds with the film and the substrate.

25. The adhesive system of Claim 24 wherein the isocyanate compound comprises an aromatic isocyanate.
26. The adhesive system of Claim 24 wherein the isocyanate compound comprises an isocyanate group terminated prepolymer synthesized from an aromatic isocyanate.
27. The adhesive system of Claim 26 wherein the prepolymer is synthesized from isocyanate and an organic compound, wherein the organic compound has at least two active hydrogen containing functional groups.
28. The adhesive system of Claim 27 wherein the active hydrogen containing functional groups are selected from the group consisting of  $-\text{COOH}$ ,  $-\text{OH}$ ,  $-\text{NH}_2$ ,  $-\text{NH}-$ ,  $-\text{CONH}_2$ ,  $-\text{SH}$ , and  $-\text{CONH}-$ .
29. The adhesive system of Claim 24 wherein the isocyanate compound comprises an aliphatic isocyanate.
30. The adhesive system of Claim 29 wherein the isocyanate compound comprises an isocyanate group terminated prepolymer synthesized from an aliphatic isocyanate.
31. The adhesive system of Claim 30 wherein the prepolymer is synthesized from isocyanate and an organic compound, wherein the organic compound has at least two active hydrogen containing functional groups.
32. The adhesive system of Claim 31 wherein the hydrogen containing functional groups are selected from the group consisting of  $-\text{COOH}$ ,  $-\text{OH}$ ,  $-\text{NH}_2$  and  $-\text{CONH}_2$ ,  $-\text{SH}$ , and  $-\text{CONH}-$ .
33. The adhesive system of Claim 24 wherein the isocyanate compound comprises between about 10% and 33% by weight NCO functional group.
34. The adhesive system of Claim 27 wherein the isocyanate compound has functionality between about 2.0 and 3.5.
35. The adhesive system of Claim 28 wherein the isocyanate compound has a viscosity between about 200 centipoise and 200,000 centipoise.
36. The adhesive system of Claim 24 wherein the catalyst comprises between about 0.005% and 5% by weight of the adhesive system.
37. The adhesive system of Claim 24 wherein the catalyst comprises a bismuth-based salt.

38. The adhesive system of Claim 24 wherein the catalyst comprises a zinc-based salt.
39. The adhesive system of Claim 24 wherein the catalyst comprises a tin-based salt.
40. The adhesive system of Claim 24 further comprises a plasticizer.
41. The adhesive system of Claim 40 wherein the plasticizer comprises an alkyl phthalate.
42. The adhesive system of Claim 24 further comprises a defoamer and a moisture scavenger.
43. The adhesive system of Claim 24 further comprises an antioxidant, a UV absorber, a heat stabilizer.
44. The adhesive system of Claim 24 wherein the building material substrate comprises a fiber cement material containing hydroxyl functional groups wherein the catalyst is adapted to catalyze a reaction between the isocyanate compound and the hydroxyl functional groups in the substrate so as to form a chemical bond between the isocyanate compound and the hydroxyl functional groups in the substrate.
45. The adhesive system of Claim 24 wherein the building material substrate comprises wood.
46. The adhesive system of Claim 24 wherein the building substrate comprises a metal material.
47. The adhesive system of Claim 24 wherein the building substrate comprises a plastics material.
48. An adhesive system for bonding a fluorohydrocarbon film to a building material substrate, comprising:
  - an isocyanate compound;
  - a polyamine; and
  - a catalyst wherein the catalyst is adapted to catalyze a reaction between the isocyanate compound and the hydroxyl functional groups present in the substrate.